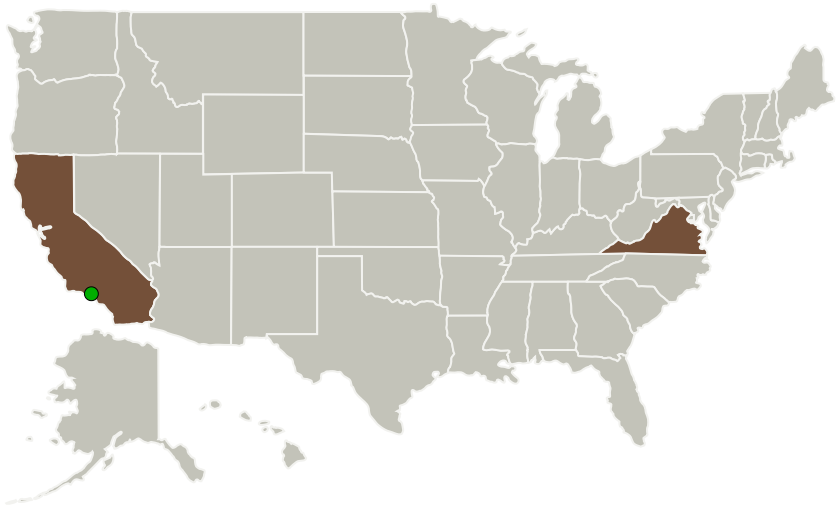
Extended Length Marsupial Rover Sensing Tether, Phase I

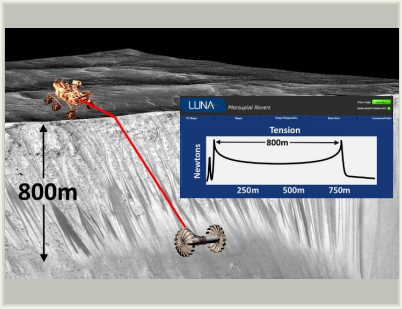
Completed Technology Project (2017 - 2017)

Project Introduction

Luna proposes to continue development of its marsupial rover sensing tether (MaRS Tether) technology by extending the length of the sensing technology out to nearly a kilometer. Luna's revolutionary technology monitors the distributed tension and curvature of a tether that connects a marsupial rover to its base station by turning a passive cable for power and communication into a powerful tool that provides information about the health and state of both the rover and the tether. The MaRS Tether can alert the base station to possible pinch points, snagged cables, or high tension due to poor traction or steep slope. Luna recently completed a Phase II SBIR with NASA JPL that introduced the first MaRS tether, identifying a snag location on a 50m tether with JPL's Axel rover and showing operation on a 100m tether. A related Phase I SBIR developed a road map for miniaturizing the tether's acquisition system. In this Phase I effort, Luna will prove the feasibility of extending the length of the sensing capabilities of the MaRS Tether through a focus on the tension measurement. This will greatly increase the operating range of lightweight, highly mobile rovers enabling more complex missions.

Primary U.S. Work Locations and Key Partners





Extended Length Marsupial Rover Sensing Tether, Phase I Briefing Chart Image

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Completed Technology Project (2017 - 2017)

Organizations Performing Work	Role	Type	Location
Luna Innovations, Inc.	Lead Organization	Industry	Roanoke, Virginia
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Virginia

Project Transitions

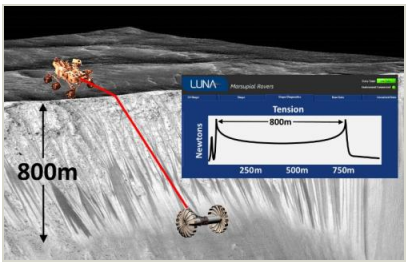
June 2017: Project Start

December 2017: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140780)*

Images



Briefing Chart Image
Extended Length Marsupial Rover Sensing Tether, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/134290)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Luna Innovations, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

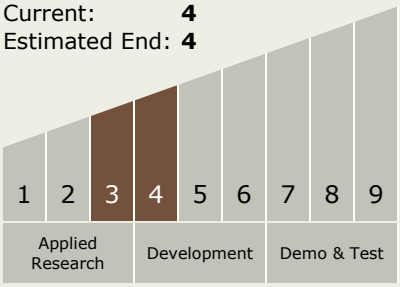
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Emily H Templeton

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.2 Mobility
    - TX04.2.6 Collaborative Mobility